

Office of Technical Assistance Research Proposal
***Alternative to Zinc Ammonium Chloride as a Flux Material
for the Galvanizing Industry***

BACKGROUND

One step in the galvanizing process requires the use of a relatively large amount of zinc ammonium chloride, a TURA reportable chemical. That step is the creation and use of a flux blanket, necessary to precondition the metal prior to its galvanization. After parts are cleaned of rust, oils, other forms of corrosion, etc., they are rinsed and then treated with zinc ammonium chloride ($\text{ZnCl}_2 \cdot 2\text{NH}_4\text{Cl}$) flux. This ensures the rapid wetting of the cleaned surfaces by molten zinc. The common method of applying this flux is to create a layer of liquid flux by applying the zinc ammonium chloride pellets to the surface of the molten zinc bath. This forms a flux layer, which will float on top of the molten zinc. The pieces to be galvanized then pass through the liquid flux layer on their way to the molten zinc bath. Agents such as tallow or sawdust are added to cause frothing, which increases the depth of the layer and reduces fuming somewhat. Fuming is, however, a problem and causes a problem in the working atmosphere in the facility where the operation is taking place.

Discussions with people in the industry, as well as some preliminary investigation by OTA, seem to indicate that there is no suitable substitute available.

BENEFITS

The development of a suitable nontoxic, non-reportable alternative to zinc ammonium chloride would result in an environmentally cleaner galvanizing process, which at the same time would benefit worker health as well. In addition to this obvious benefit, there would be cost savings to these companies associated with both the elimination of the time required, and the fees mandated, in order to comply with regulatory reporting requirements.

SCOPE OF PROBLEM

There is one company filing for this chemical under TURA. The company is in SIC Code 3479, and the usage, in pounds, based upon the most recently available TURA data (1998) is 17,000. This company is strictly a galvanizing job shop.

While the initial response to solving this problem may be that it yields a small return for the investment, that may not be the case. There may be a number of smaller shops that use the chemical for this purpose that are under TURA reporting thresholds for chemical use. These shops could also benefit from a safer alternative chemical. For this reason it is recommended that researchers consider this project.

SCOPE OF WORK

This project would require the simulation of a galvanizing process, complete with molten zinc bath on a laboratory scale. Potential substitutes would then be tested on coupons to determine if they performed the function of a flux suitably. The best candidate(s) could then be evaluated with a partnering galvanizing company, at whose facility the trials could be carried out and the results documented.